

Prevalence and determinants of healthy dietary habits among hypertensive patients attending primary health care centers in Al-Baha City, Saudi Arabia: A cross-sectional study

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Abstract

Background: Hypertension is a serious healthcare problem and a highly prevalent disease in Saudi Arabia. Dietary modification plays an important role in its management. This study aimed to evaluate the dietary habits among hypertensive patients.

Methods: This cross-sectional study was conducted among 116 hypertensive patients attending Bani Farwah Primary Healthcare Center (PHCC) in Al Baha City, Saudi Arabia. The dietary habits of the participants were evaluated using a self-administered questionnaire.

Results: Out of 116 participants, the number of male participants was 97 (83.6%). Almost half of the participants (50.9%) were on a low healthy diet index (HDI), 49.1% were on moderate HDI, and none were on high HDI. Almost one-fifth of the participants (20.7%) were avoiding salt in their meals, and 20.7% were avoiding adding sugar to hot drinks. Male and elderly patients had lower HDI ($P = 0.008$ and $P = 0.004$, respectively).

Conclusions: Most hypertensive patients do not follow healthy food. Healthcare providers need to increase patients' awareness through health education toward better control of their blood pressure. Further community-based studies, on a larger sample are needed.

Keywords: Diet, Hypertension, Cross-sectional study, Saudi Arabia

Introduction

Hypertension is one of the most critical public health problems worldwide, and a leading cause of morbidity and mortality (1). Uncontrolled hypertension is a significant risk factor for coronary artery disease, stroke, and renal failure (2–4). Hypertension was defined as a high blood pressure measurement of $\geq 135/85$ mmHg, or $\geq 140/90$ Hg (when measured by an electronic device), or $\geq 130/80$ Hg in diabetic patients (5).

For the management of hypertension, lifestyle modifications, including the following Dietary Approach to Stop Hypertension (DASH) are recommended. The National Heart, Lung and Blood Institute (NHLBI) (6) described an example of DASH eating plans as follows:

- Daily 6-8 servings of grains, \leq six servings of meats, poultry, and fish, 4-5 servings of fruits and the same amount for vegetables, 2-3 servings of low-fat or fat-free dairy products, and an equal amount for fats and oils.
- Daily sodium intake of less than 2300 mg (ideally 1500 mg).
- Weekly 4-5 servings of nuts, seeds, dry beans, and peas, and \leq five servings of sweets.

On the other hand, according to the World Health Organization WHO (7), the healthy diet for adults consists of:

- Five portions of fruits and vegetables per day.
- Less than 10% of the daily calories from sugars (about 12 teaspoons) or 5% for additional benefits.
- Less than 30% of daily calories from unsaturated fats (fish, avocado, nuts, etc.) and to eliminate fats found in fast and processed foods.
- Less than 5 g of iodized salt per day (1 teaspoon).

In 2013, the Saudi Health Information Survey (SHIS) showed a total of 1,957,191 (15.2% of the population) had hypertension, of whom 57.8% were not previously diagnosed, 20.2% were uncontrolled, and 5.4% were untreated (8).

Hypertension is a serious healthcare problem and a highly prevalent disease in Saudi Arabia with a high percentage of uncontrolled, undiagnosed, and untreated cases. The Saudi Hypertension Management Society guidelines (SHMS) defined hypertension as a continuous elevation of systolic blood pressure of ≥ 140 mmHg, and the diastolic blood pressure of ≥ 90 mmHg. The SHMS guidelines also recommended lifestyle modification including DASH and low sodium diet as the first step to control hypertension (9).

This study was conducted to determine the prevalence of healthy dietary consumption by hypertensive patients and to identify the determinants associated with the healthy dietary habits consumption among hypertensive patients attending PHCCs in Al-Baha City.

Methodology

Following a cross-sectional study, a total of 116 adult hypertensive patients (aged 18-65 years) who were registered at Bani-Farwah PHCC were interviewed by the researchers. This PHCC was selected following a simple random method.

The self-administered standardized KomPAN® dietary habits and nutrition beliefs questionnaire (10) which was created by the Behavioral Nutrition Team, Human Nutrition Committee, Polish Academy of Sciences (evaluated and tested) was used for data collection after being translated into Arabic. The internal consistency of the translated version was high, being 0.8, as assessed by the Cronbach alpha coefficient.

The questionnaire includes the following parts:

- **Cover page:** Displayed the overall information about the purpose of the study and stated that the collected data were completely anonymous and confidential.
- **Patients' general data:** Age, gender, smoking status, income and educational level.
- **Hypertension data:** Duration of hypertension, and number of medications.
- **Healthy dietary habits:** It comprises two parts;
 - **First Part:** General dietary habits, frequency of meals per day, and whether he/she consumes his/her meals regularly, etc.
 - **Second Part:** Frequency of food items daily intake, e.g., junk food, fruits and vegetables, meat, fats, grains/whole grains, baked products, sugars, salt, and water.

Data collection and processing

The study questionnaire was distributed at the Chronic Diseases Clinic in the study PHCC. Using the recommended method of data processing, the quality of the diet was assessed using the healthy diet index (HDI). The calculated value of the HDI was based on the sum of frequencies of consuming the selected group of 10 healthy food components of the HDI. (Table A). According to the methodology of KomPAN® questionnaire analysis (10), the frequency of consuming the food products is listed in Table (A) in the form of frequency/day (Table B). The resultant values were summed up for each participant and the method of interpretation of these values is presented in Table (C).

Using the recommended interpretation method in the KomPAN® questionnaire made it possible to determine the intensity of the adherence to the healthy food components (low, moderate or high) for each participant.

Table (A): KomPAN® Questionnaire list of food products of healthy diet index HDI (10)

Food components of the HDI in KomPAN® Questionnaire	
1	<i>Whole meal (brown) bread/bread rolls</i>
2	<i>Buckwheat, oats, wholegrain pasta, or other coarse-ground groats</i>
3	<i>Milk (including flavored milk, hot chocolate, latte</i>
4	<i>Fermented milk drinks, e.g., yogurts, kefir (natural or flavored)</i>
5	<i>Fresh cheese curd products, e.g., cottage cheese, cream cheese, cheese-based puddings</i>
6	<i>White meat, e.g., chicken, turkey, rabbit</i>
7	<i>Fish</i>
8	<i>Legumes-based foods, e.g. beans, peas, soybeans, lentils</i>
9	<i>Fruit</i>
10	<i>Vegetables</i>

HDI = Sum of consumption frequency of 10 groups of food products (times/day)

Table (B): Recommended frequency of consuming food items in KomPAN® Questionnaire (10)

Consumption frequency	Daily frequency (times/day)
Never	0
1-3 times a month	0.06
Once a week	0.14
A few times a week	0.5
Once a day	1
A few times a day	2

Table (C): Recommended HDI interpretation method in KomPAN® Questionnaire

Intensity of dietary characteristics	Range (Times/Day)	Range (in points)
Low	0-6.66	0-33
Moderate	6.67-13.33	34-66
High	13.34-20	67-100

The general dietary habits of the patients were collected, e.g., how many meals or snacks a day, regularity of meal timing, salt, and water intake, type of drinking water, and type of oil used for frying, and analyzed by calculating frequency and percentage of each category. The general data collected, e.g., age, gender, smoking status, income, education level, and how the patient evaluates his/her knowledge about healthy foods. These data were then calculated and analyzed using the frequency and percentage of each category. The Chi-Square test was used to compare the resulting groups of patients (low, moderate, or high) and to test for the influence of these data on a healthy diet. P-values <0.05 were considered as statistically significant.

The ethical approval was fulfilled by the General Directorate for Health Affairs in Al-Baha City. Verbal consent was taken from all participants before the start of data collection. The researchers ensured the confidentiality of all collected data and privacy during data collection.

Results

The age group of more than half of participants was 46-65 years (60, 51.7%). Most participants were males (97, 83.6%). About one-quarter (33, 28.4%) were smokers. A large number of the responders were at 10,000 – 15,000 SR monthly income (75, 64.7%). Regarding their level of education, the results show that about 46 (39.7%) were at the university level of education, 26 (22.4%) finished high school, and 22 (19%) had secondary school (Table 1).

Figure (1) shows that 50.9% of the participants were on a low HDI grade, indicating low adherence to the healthy food components of the HDI. All other participants (49.1%) had moderate HDI grades, while none of the participants (0%) had a high HDI grade.

Figure (2) shows that most participants (56.9%) stated that they had insufficient knowledge about healthy foods, while 18.1% stated that they had sufficient knowledge, and 25% had good knowledge.

Table (2) shows that most participants consume 2 or 3 meals daily (48.3% and 37.7%, respectively). Consumption of meals at regular times was not performed by 41.4% of participants, while 33.6% sometimes performed it, and 25% always performed it. About one-third of participants (34.5%) have snacks once daily, and 12.9% have snacks a few times daily. Full-fat milk and dairy products were consumed by 42.3% of participants, while low fat was consumed by 42.2%, and 15.4% consumed no-fat milk. More than half of the participants (53.4%) sometimes add salt to their meals, while 25.9% add salt to most of their meals and 20.7% do not add salt to their meals. Almost half of the participants (46.6%) add one teaspoon of sugar (or honey) to their hot drinks, while 14.7% add two or more teaspoons and 18.1% use sweeteners.

Table (3) shows that the healthy diet index differed significantly according to participant gender ($p=0.008$), with males having lower HDI than females, and also according to participants' age groups ($p=0.004$), with older participants having significantly lower HDI than younger ones. However, participants' HDI did not differ according to their family monthly income, educational level, or their perceived knowledge about healthy diets.

Table (1): Participants' personal characteristics

Personal Characteristics	No.	%
Gender		
• Male	97	83.6
• Female	19	16.4
Age (in Years)		
• 18-35	17	14.7
• 36-45	39	33.6
• 46-65	60	51.7
Current smoking status		
• Smoker	33	28.4
• Non-smoker	83	71.6
Family monthly income		
• <10,000 SR	23	19.8
• 10,000 – 15,000 SR	75	64.7
• >15,000 SR	18	15.5
Education level		
• Illiterate	12	10.3
• Primary	10	8.6
• Secondary	22	19.0
• High school	26	22.4
• University	46	39.7

Figure 1: Distribution of the percentages of participants' healthy diet index grades

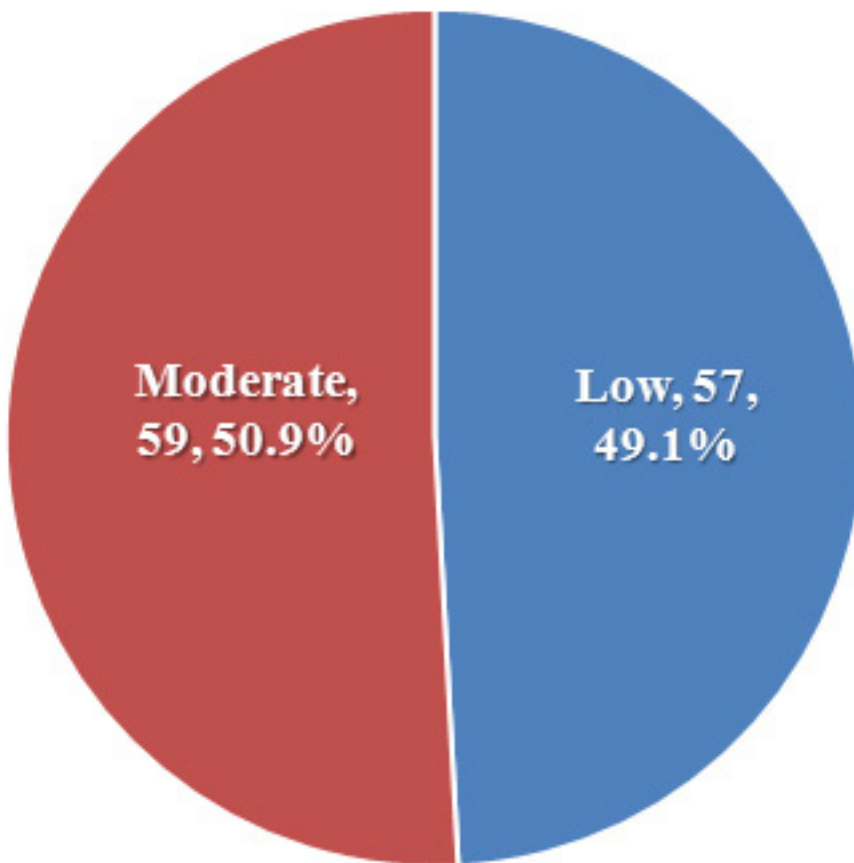


Figure 2: Participants perception regarding their knowledge level about healthy foods

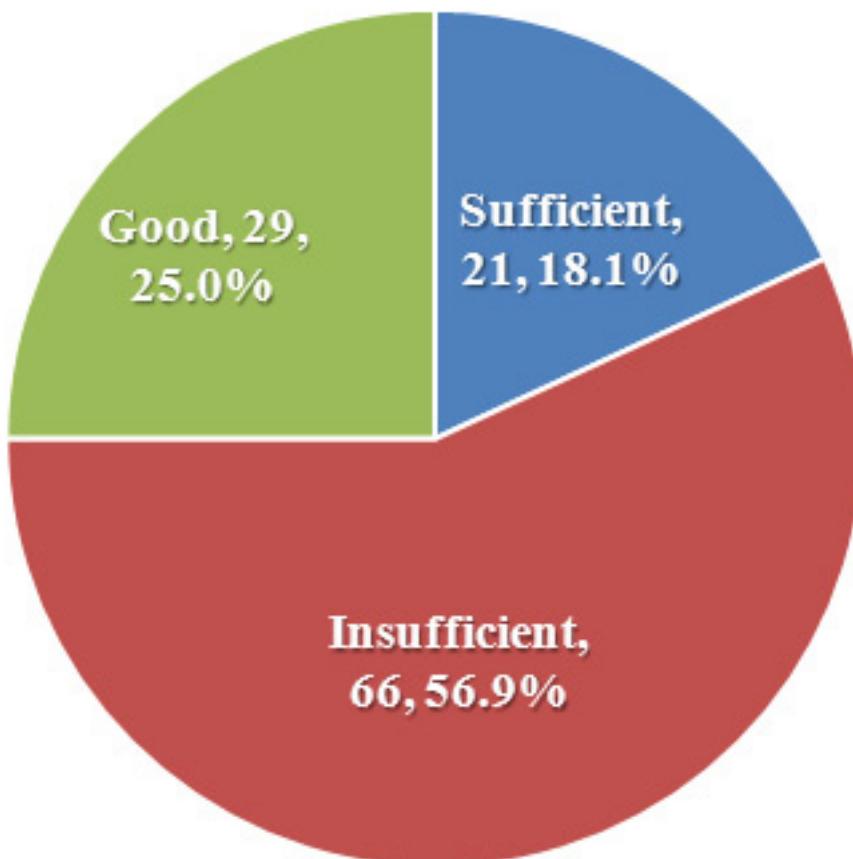


Table 2: Participants' consumption patterns of various food items

Consumed food items	No.	%
No. of daily meals		
• 1 meal	14	12.1
• 2 meals	56	48.3
• 3 meals	43	37.7
• 4 meals or more	3	2.6
Consuming meals at regular times		
• No	48	41.4
• Only sometimes	39	33.6
• Always	29	25.0
Having snacks between meals		
• Never	23	19.8
• 1-3 times a month	11	9.5
• Once a week	10	8.6
• A few times a week	17	14.7
• Once a day	40	34.5
• Few times a day	15	12.9
Type of consumed milk and dairy products		
• Full fat	50	42.3
• Low fat	49	42.2
• No fat	18	15.4
Adding salt to meals/sandwiches once prepared		
• No	24	20.7
• Yes, but only sometimes	62	53.4
• Yes, I add salt to most of my meals	30	25.9
Adding sugar to hot drinks		
• No	24	20.7
• Yes, I add one teaspoon of sugar (or honey)	54	46.6
• Yes, I add two or more teaspoons of sugar (or honey)	17	14.7
• Yes, I use sweeteners (low-caloric substitute for sugar)	21	18.1

Table 3: Distribution of participants' healthy diet index grades according to their characteristics

Characteristics	Low		Moderate		P-value
	No.	%	No.	%	
Gender					
• Male	53	54.64	44	45.36	0.008†
• Female	4	21.05	15	78.95	
Age groups					
• 18-35	4	23.53	13	76.47	0.004†
• 36-45	15	38.46	24	61.54	
• 46-65	38	63.33	22	36.67	
Family monthly income					
• <10,000 SR	7	30.43	16	69.57	0.065
• 10,000 – 15,000 SR	38	50.67	37	49.33	
• >15,000 SR	12	66.67	6	33.33	
Educational level					
• Illiterate	2	16.67	10	83.33	0.138
• Primary	5	50.00	5	50.00	
• Secondary	10	45.45	12	54.55	
• High school	16	61.54	10	38.46	
• University	24	52.17	22	47.83	
Smoking status					
• Smoker	17	51.52	16	48.48	0.747
• Nonsmoker	40	48.19	43	51.81	
Knowledge about healthy diet					
• Insufficient	35	53.03	31	46.97	0.181
• Sufficient	12	57.14	9	42.86	
• Good	10	34.48	19	65.52	

† Statistically significant

Discussion

Hypertension is one of the most critical public health problems worldwide, it is a leading cause of morbidity and mortality and is highly prevalent in Saudi Arabia (1;8). Uncontrolled hypertension is a causative factor for cardiovascular disease, stroke, and renal insufficiency (2–4).

The findings of the present study showed that most participants were above 44 years of age, with the age group of more than half of participants being 45-65 years (51.7%). Moreover, most participants were males (83.6%), and the prevalence of current smoking was high (28.4%). Regarding their level of education, about one-third of participants (39.7%) were highly educated (i.e., university graduates).

Most studies indicated that the majority of the participants were aged 50 years, in the USA (11); Egypt (12); and Nepal (13). In Ethiopia, Kebede et al. (14) reported that more than half of participant hypertensive patients were males (53.5%), with a mean age of 50 years. However, the study of Maharjan et al. (13) reported that the prevalence of hypertension was higher among females than males.

Rahimi and Nkombua (15) found that 18% of hypertensive patients were current smokers. Clinical guidelines for the management of hypertension indicate that stopping smoking reduces the risk of high blood pressure (16-17). A qualitative cross-sectional survey in Botswana reported that 96.4% of practices to control hypertension include prohibiting smoking (18).

Rahimi and Nkombua (15) noted that the majority of the participants in the study did not attain a level of high education. They stated that education empowers people to take care of their health issues. Rizvi et al. (19) and Veghari et al. (20) reported that a good level of education has a significant association with controlling hypertension, and described a relationship between the level of literacy of patients and control of hypertension. In addition, Powers (21) and Yilmazel (22) reported a significant relationship between the level of literacy of patients and the prevention, diagnosis, and control of hypertension.

Evaluating the dietary habits among hypertensive patients attending PHCCs, the present study showed that more than half of hypertensive patients (56.9%) had insufficient knowledge about healthy foods, while 50.9% had low HDI

grade, i.e., they did not follow a healthy and balanced diet. Adding salt to meals and adding sugar to hot drinks were stated by most participants. Males and older patients had significantly less HDI.

Several studies concluded that diet control is among the most important initial steps toward hypertension management (5). It has been reported that a healthy diet, is simply described as five servings of fruits and vegetables a day with less than 10% of the daily calorie intake from sugars, less than 30% of the daily calories from unsaturated fats with avoidance of trans fats, as well <5 g of salt per day (7).

In South Africa, Rahimi and Nkombua (15) reported that the majority of participant hypertensive patients had poor knowledge and practices of lifestyle modifications, with 50% of the participants being unable to maintain a balanced healthy diet, which included fruits and vegetables. Also, Maharjan et al. (13), in Nepal, found that more than half of participant hypertensive patients (53.3%) had poor knowledge regarding dietary control of hypertension.

This is similar to several other studies that also found poor knowledge and practices regarding healthy diets among hypertensive patients in India (23-24); Sri Lanka (25); Nigeria (26); and Botswana (18).

It is to be noted that the consumption of fruits and vegetables, grains, and legumes are essential constituents of a healthy diet. In Mozambique, Jessen et al. (27) reported that the majority of hypertensive patients had awareness about reducing salt intake. Moreover, males and older patients were less compliant with healthy diets than younger ones.

Similarly, several authors revealed some complacency in their hypertensive patients; Alawwa et al. (28), in Libya, and Wicaksana et al. (29) in Indonesia stressed that even with good awareness of reducing salt intake there was still a high rate of uncontrolled hypertension because of the low rate of practicing this behavior by patients. These findings concur with those findings of Rahimi and Nkombua (15), who indicated that dietary actions to control hypertension not only included salt reduction but also other measures, such as the consumption of fruits, vegetables, grains, and legumes.

DiNicolantonio et al. (30) noted that, while naturally occurring sugars, in the form of whole foods like fruit are of no concern, epidemiological and experimental evidence suggest that added sugars are a problem and should be targeted more explicitly in dietary guidelines to support general health. Added sugars probably matter more than dietary sodium for hypertension, and fructose in particular may uniquely increase cardiovascular risk by inciting metabolic dysfunction and increasing blood pressure, myocardial oxygen demand, and heart rate. Just as most dietary sodium does not come from the salt shaker, most dietary sugar does not come from the sugar bowl; reducing the consumption of added sugars by limiting

processed foods containing them, made by corporations would be a good place to start. Reducing processed food consumption would be consistent with existing guidelines already in place that misguidedly focus more on the less-consequential white crystals (salt).

The evidence is clear that even moderate doses of added sugar for short durations may cause substantial harm. Therefore, dietary guidelines should advocate substituting highly refined processed foods (i.e., those coming from industrial manufacturing plants) for natural whole foods (i.e., those coming from living botanical plants) and be more explicitly restrictive in their allowances for added sugars.

In conclusion, adherence to a healthy diet (e.g., consumption of high fiber, low fat, sugar, and salt intake) by hypertensive patients in Baha City is suboptimal. Male and elderly patients show lower levels of adherence to a healthy diet than females. Therefore health education should be enforced, especially for these groups. Moreover, there is a pressing need to control diet. Healthcare providers need to maximize their efforts to provide health education and promote healthy dietary habits for hypertensive patients, especially for males and the elderly. It is necessary to conduct further community-based studies on larger samples.

Study limitations

The present study was conducted in one city only. Moreover, the study followed a cross-sectional research design, which is good for hypothesis generation rather than hypothesis testing. In addition, most collected data were subjective with a self-reported nature. Therefore, the generalizability of its findings should be cautiously considered.

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